COLORADO RIVER MANAGEMENT OVERVIEW

Because the Colorado River is one of the few perennial water supplies for some of the hottest and most arid areas of the United States, its waters have been the subject of debate and competition for many years. The Colorado River provides water to over 17 million people and to more than one million acres of farmland in Arizona, California, and Nevada. Hydroelectric plants on the river generate about 12 billion kilowatt-hours of electricity annually. Because the river is so vital to the economies of the southwestern United States and Mexico, it has become one of the most regulated and managed rivers in the United States.

Modern use of Colorado River water for irrigation began in the late 1800s when water was diverted for use in California's Imperial Valley. By 1901 some 100,000 acres of farmland were irrigated with Colorado River water in the Imperial Valley. Competition for Colorado River water supplies has increased steadily among States in the Colorado River Basin, which includes parts of Wyoming, Colorado, Utah, Arizona, New Mexico, Nevada and California. As previously explained, competition for the supplies of the Colorado River resulted in decades of political and legal confrontation and compromise. But even after Congress and the U.S. Supreme Court agreed to the apportionment of the river, competition for its waters continues.

WATER SUPPLY AVAILABILITY

Of the 7.5 million acre-feet of water available to the lower basin states of California, Arizona and Nevada, Arizona's CAP water supply has the most junior priority. If water supplies are below normal, Arizona must curtail use of its 1.5 million acre-foot CAP entitlement first. When the Colorado River Compact was negotiated, average annual flows were estimated to be about 18 million acre-feet. It now appears that a more accurate flow estimate is 14 million acre-feet annually. Concern over possible long term water supply shortages has resulted in studies regarding water supply augmentation of the Colorado River by weather modification and vegetative management. Exotic methods of augmentation such as desalinization of seawater have even been evaluated, but high costs make these schemes infeasible at this time.

CENTRAL ARIZONA PROJECT

Arizona has under-utilized its share of Colorado River water, the unused portion going to population centers in southern California. This under-utilization was expected to end when the Central Arizona Project (CAP) began delivering river water to the Phoenix and Tucson metropolitan areas and irrigation districts. However, many factors including a recent depression in the agricultural economy and the high price of CAP water relative to other sources, including groundwater, have resulted in continuing under-utilization of the CAP entitlement. Because of recent drought conditions in California and rapid population growth in California and Nevada, Arizona interests have expressed concern that pressure to reapportion the Colorado River's water may be growing.

The use of Colorado River water through the CAP has long been a major water management strategy. The intended purpose of the CAP, as authorized by Congress, was to reduce dependence of the State's economy on dwindling groundwater resources. It was originally conceived as a water supply project which would reduce groundwater overdraft and provide a stable renewable supply of water to preserve, not expand, the agricultural economies of central Arizona.

To accomplish this intent, the Colorado River Basin Project Act of 1968 prohibits use of CAP water for irrigation on non-Indian lands without a history of irrigation between 1958 and 1968. Furthermore, the Act requires that contracts for the use of CAP water must contain provisions to control the expansion of groundwater use. However, the focus of the Project quickly changed as Arizona began to grow and develop in the late 1960s and early 1970s. The first State water plan published in the mid 1970s indicated the growth of Arizona's cities and industries could

only be assured if groundwater pumping was offset by the use of CAP water. Some Indian communities were also pressing their water rights claims, requesting that more water from the CAP be allocated to them.

The pressures to reduce groundwater pumping and use CAP water supplies as an alternative supply led directly to enactment of the 1980 Groundwater Management Code with its policy to protect and stabilize the general economy and welfare of the State by managing water resources. The availability of future CAP water supplies allowed water rights settlements to be enacted for the Ak Chin, Tohono O'Odham, Salt River Pima, Fort McDowell and San Carlos Apache tribes.

The cost of CAP water is higher than most alternate supplies of water, which has resulted in a short-term reduction in water demand especially for agricultural purposes. The high cost of CAP water could make the water uneconomical as a source for future Indian water rights settlements and as a substitute water supply for irrigated agriculture. In some cases, CAP water may not be economically feasible as a dependable supply for municipal or industrial growth. The impact of under-utilization of CAP water may be continued groundwater overdraft which could negatively impact the ability to conjunctively manage water supplies. Intensive planning by the State is underway to address the financial and allocation issues of the CAP.

FUTURE DISTRIBUTION OF WATER

As Arizona uses more of its Colorado River allotment, competition for available water within the State may increase. Rapid growth along the Colorado River in the Yuma, Lake Havasu City, Bullhead City and Parker areas will require increasingly larger diversions for local use. These increased diversions may lead to conflicts with CAP water users in central and southern Arizona during periods of limited surface water availability.

WATER QUALITY

Water quality problems in the Colorado River are significant, since the river carries an estimated nine million tons of salts annually. The lower Colorado contains about 2,000 pounds of salts per acre-foot. Salinity increases downstream due to evaporation, agricultural activities, leaching of salts from soils, and other factors. High salinity levels also originate in several tributaries, especially the Virgin River, which flows through Arizona into Nevada. Salinity is expected to increase as States utilize more of their apportionments.

Because return flows to the river in the Wellton-Mowhawk area are highly saline, the United States Government has built a desalting plant near Yuma to help assure acceptable water quality for Mexico. This plant, which can produce about 100,000 acre-feet of reclaimed water annually, cost an estimated $484 million when construction was completed in 1993. Before the plant was operational, the United States Government had to bypass saline return flows around Mexico's diversion point via the Santa Clara slough. This bypass provided water for the development of considerable vegetation and fauna, particularly migratory birds. Flows from the plant will increase slough water in salinity and will decrease flows in quantity, threatening the newly formed habitat. Ongoing committees to study and mitigate high salinity in the Colorado River, including the Colorado River Salinity Control Forum, meet on a regular basis to address this issue and other related water quality problems.

LAW OF THE RIVER

Colorado River Compact (1922) In early 1921 the seven Colorado River Basin States authorized appointment of commissioners to negotiate a compact for the apportionment of the water supply of the river and its tributaries. Congress allowed the States to negotiate and conclude a compact under the leadership of Herbert Hoover as representative of the United States. An agreement was negotiated and signed by the seven appointed commissioners from each of the Colorado River Basin States in November of 1922.

The Compact divided the Colorado River Basin into the Upper Basin and Lower Basin which are defined as those states or parts of states from which waters naturally drain into the Colorado River above and below Lee's Ferry, respectively. Lee's Ferry is a point on the mainstream of the River approximately one mile below the mouth of the Paria River in northern Arizona.

FEDERAL LAWS OF THE COLORADO RIVER	
Year	**Action**
1922	Colorado River Compact apportioned 7.5 MAF to Lower Basin States of California, Arizona and Nevada
1928	Boulder Canyon Project Act authorized Hoover Dam and All American Canal. Apportioned Lower Colorado River water CA - 4.4 MAF; AZ - 2.8 MAF; NV - 0.3 MAF
1945	Mexican Water Treaty apportioned 1.5 MAF to Mexico
1948	Upper Colorado River Basin Compact. Arizona was apportioned 50,000 AF of water for territory in Upper Colorado River Basin drainage
1964	Arizona vs. California. U.S. Supreme Court Decree. Ratification of 1928 apportionment of the Colorado River water supply
1968	Colorado River Basin Project Act. Authorized construction of the Central Arizona Project. Set forth law governing the distribution and use of the CAP water.
1974	Colorado River Basin Salinity Control Act. Authorized works to control salinity of Colorado River water below Imperial Dam as part of Mexican Treaty obligation.

The Compact apportioned, in perpetuity to the Upper Basin and to the Lower Basin respectively, the exclusive beneficial consumptive use of 7.5 million acre-feet of water annually. The Lower Basin was given the right to increase its then current beneficial consumptive use by one million acre-feet annually. The Compact further provided that any burden which might arise because of a water treaty with Mexico would be shared equally by the two basins. The Upper Basin was required to restrict its use so that the flow of the river at Lee Ferry would not be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years. The Compact also established a preference for agriculture and domestic uses over water uses for power generation.

Boulder Canyon Project Act (1928) This Act authorized the construction of Hoover Dam and Power Plant and the All-American Canal. In addition, provision was made for the sharing of water by the Lower Basin States, and authorization was given to the Secretary of the Interior to execute contracts for water made available by the Boulder Canyon Project, subject to the terms of the Colorado River Compact.

The provisions of the Act stipulated that it would take effect upon the fulfillment of either of two conditions. The first was that all seven States ratify the Colorado River Compact. Because Arizona was not satisfied with the terms of the Compact, it became impossible to meet this condition. In fact, Arizona did not ratify the Colorado River Compact until 1944. The second condition required that six of the States, including California, ratify the Compact, and that California agree to limit its consumptive use of water from the Colorado River to 4.4 million acre-feet. With the exception of Arizona, all of the Colorado River Basin States ratified the Compact, and passage of The California Limitation Act of 1929 completed the conditions required to make the Act effective. President Herbert Hoover declared the Boulder Canyon Project Act and the Colorado River Compact in effect on June 25, 1929.

The Act also authorized the States of Arizona, California, and Nevada to enter into an agreement whereby the 7.5 million acre-feet of water that was apportioned to the Lower Basin by Article III(a) of the Colorado River Compact would be apportioned as follows: to California, 4.4 million acre-feet per annum; to Arizona, 2.8 million acre-feet per annum; and to Nevada, 0.3 million acre-feet per annum. The three States, however, were unable to agree on

such an apportionment.

Mexican Treaty (1945) The water treaty between the United States and Mexico involving waters of the Colorado River became effective November 8, 1945. The Treaty allocated to Mexico 1.5 million acre-feet of Colorado River system waters annually, to be increased in years of surplus to 1.7 million acre-feet and also to be reduced proportionately during years of extraordinary drought. The Treaty dealt with quantity and was silent on the quality of water to be delivered.

In 1962, the Mexican Government formally protested to the United States Government regarding the quality of Colorado River water that was being delivered to the Mexicali Valley. Upon the request of the State Department, the governors of the seven Colorado River Basin States reconstituted the Committee of Fourteen (two water experts from each of the seven Basin States appointed by the governor) as a means of providing advice on the Mexican water salinity problem to the State Department and to the International Boundary and Water Commission.

After 1962, numerous meetings and negotiations led to adoption of Minute 242, executed in 1973, which obligates the United States to implement measures that will maintain the salinity of the Colorado River waters delivered to Mexico at nearly the same quality as that diverted at Imperial Dam for use within the United States.

On June 24, 1974, the Colorado River Basin Salinity Control Act was signed into law, providing for the physical works necessary to implement Minute 242 without permanent loss of water to the Colorado River Basin States. This Act also authorizes the construction of four upstream salt control projects, including the Yuma Desalting Plant, to maintain salinity levels in the lower river at or below 1972 levels, which was completed in 1993. The Act also authorizes construction of a large well field along the border south of Yuma to prevent Mexico from drawing large quantities of surface and groundwater from the United States via an existing large well field operated by the Mexican Government.

Upper Colorado River Basin Compact (1948) This Compact, dated October 11, 1948, divided the water apportioned to the Upper Basin by the Colorado River Compact between the five States having territory in the Upper Basin. Arizona was allocated 50,000 acre-feet per annum with the remainder of the Upper Basin entitlement divided according to the following percentages: Colorado, 51.75; New Mexico, 11.25; Utah, 23.00; and Wyoming, 14.00.

U.S. Supreme Court Decree in Arizona vs. California (1964) Failure of the three Lower Basin States to reach agreement on sharing of the water apportioned to the Lower Basin by the Colorado River Compact, despite many years of negotiation and controversy, led finally to the Supreme Court suit filed by Arizona in 1952, known as Arizona vs. California, et al. After ten years of trial, the Court concluded in 1963 that Congress, by enactment of the Boulder Canyon Project Act, had provided its own method of allocating waters among the lower Basin States and that this method applied to the first 7,500,000 acre-feet per annum of mainstream water, exclusive of the tributaries. California had argued that the first 7,500,000 acre-feet per annum of Lower Basin water, of which it had agreed to use only 4,400,000, included both mainstream and tributary water - not just mainstream water. Arizona, Nevada, and the United States contended that the tributaries should not be included in the water to be divided, but should remain for the exclusive use of each State.

The decree handed down in 1964 apportioned the first 7,500,000 acre-feet per annum of Colorado River mainstream water available to the three Lower Basin States as follows: Arizona, 2,800,000; California, 4,400,000; and Nevada, 300,000. Any excess above 7,500,000 was apportioned 50 percent to California and 50 percent to Arizona, except that Nevada was given the right to contract for 4 percent of the excess, which would come out of Arizona's share. The Court left the allocation of shortages to the discretion of the Secretary of the Interior after providing for satisfaction of present perfected rights in the order of their priority dates. Present perfected rights (PPR) were defined as rights existing and used prior to June 25, 1929, the effective date of the Boulder Canyon Project Act. The allocation of shortages was later determined by Congress in Section 301(b) of the Colorado River Basin Project Act (1968).

Colorado River Basin Project Act (1968) This Act authorized the Central Arizona Project, and other water

development projects in the Upper Basin. The Central Arizona Project was to provide the conveyance and storage facilities necessary to import a major portion of Arizona's remaining share of Colorado River water into the south-central part of the State. The Act also directed the Secretary of the Interior to prepare long-range water resources studies directed toward the augmentation of the Colorado River, to prepare criteria for the coordinated long-range operation of the Colorado River reservoirs, and to undertake programs for water salvage and groundwater recovery along and adjacent to the mainstream of the Colorado River.

Section 301(b) of the Act provides for the allocation of water in times of shortage in the Colorado River. This section provides that the Supreme Court decree in Arizona vs. California shall be so administered that in any year in which the Secretary determines there is insufficient mainstream water to satisfy 7.5 million acre-feet of consumptive use in Arizona, California, and Nevada, diversions to the Central Arizona Project shall be so limited as to assure the availability of water to satisfy water uses in California of 4.4 million acre-feet and water rights in Arizona and Nevada which are prior to the Central Arizona Project. This provision does not in any way affect the relative priorities, among themselves, or prior Lower Basin water rights. This limitation is inoperative in any year in which the Secretary of the Interior proclaims that means are available and in operation which augment the water supply of the Colorado River in sufficient quantities to satisfy the full 7.5 million acre-feet of consumptive use in Arizona, California, and Nevada.

Section 304(a) of the Act contains a prohibition against water from the Central Arizona Project being used to irrigate lands not having a recent history of irrigation. "Recent history of irrigation" has since been determined by the Secretary of the Interior to mean irrigation at some time between September 30, 1958, and September 30, 1968, the date on which the Act became law. Indian lands are an exception to this prohibition.

Contracts for Central Arizona Project water must contain provisions to control expansion of groundwater use for irrigating in the contract service area. Furthermore, pumpage of groundwater from within a contractor's service area for any use outside that service area is prohibited except where it is determined that surplus groundwater exists or that drainage is required.

This Act also declared that the satisfaction of the requirements of the Mexican Water Treaty from the Colorado River constituted a national obligation which shall be the first obligation of any water augmentation project planned pursuant to the Act and authorized by the Congress. This provision of the Act is very important to the States of the Colorado River Basin, and to Arizona in particular, because of the shortage provision described above.

The Act also directed the Secretary of the Interior to propose criteria for the coordinated long-range operation of federal reservoirs in the Colorado River Basin. These criteria were subsequently developed in cooperation with the Colorado River Basin States and were adopted by the Secretary on June 8, 1970.